(12) UK Patent Application (19) GB (11) 2 257 091 (13) A

(43) Date of A publication 06.01.1993

(21) Application No 9213681.1

(22) Date of filing 26.06.1992

(30) Priority data
(31) 9110682 (32) 26.06.1991 (33) KR

(51) INT CL[5]
B42D 15/02, G09F 9/35

(52) UK CL (Edition L)
B6A ADE A316
G5C CAB CA315 CA342 CA375 CHF
U1S S2268

(56) Documents cited
GB 2151549 A GB 2132135 A GB 1450423 A

(58) Field of search
UK CL (Edition K) B6A ADE, G5C CAB
INT CL[5] B42D, G09F
Online databases: WPI

(71) Applicant
Samsung Electron Devices Co Ltd

(Incorporated in th . Republic of Korea)

575, Shin-ri, Taean-eub, Hwaseong-gun,
Kyungki-do, Republic of Korea

(72) Inventors
Si-Hwan Kim
Nam-Seok Lee

(74) Agent and/or Address for Service
Elkington and Fife
Prospect House, 8 Pembroke Road,
Sevenoaks, Kent TN13 1XR, United Kingdom

(54) **Card having pattern display function**

(57) A card 1, 1', eg. a greetings card or advertising card, with a pattern display function includes a liquid crystal display having a plurality of display cell units 21, front and rear resin films 2b and 2b' separated from each other by a predetermined distance, a plurality of first electrodes 2a of a certain pattern formed on the resin film 2b, a second electrode 2a' opposing the first electrodes and being formed on the rear resin film 2b' and a liquid crystal layer 2c interposed between the front and rear resin films. A driver (3, Fig 4) is provided for driving the display cell units in a pre-determined sequence. Power to drive the display comes from an element (5, Fig 4) which comprises either a solar cell or a battery cell in combination with a light sensitive switch.

FIG.1

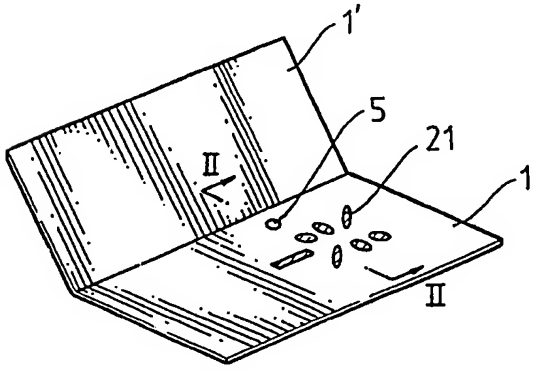
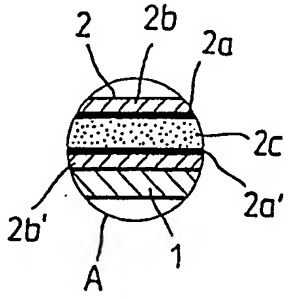


FIG.3



GB 2 257 091 A

FIG.1

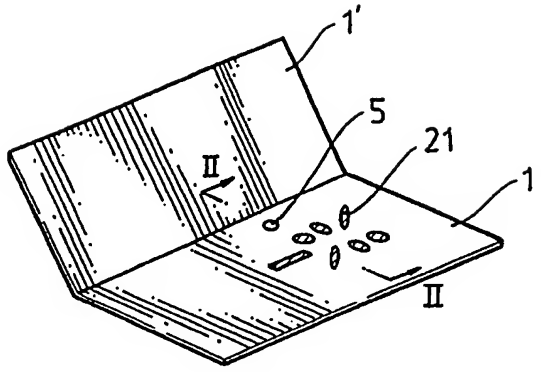


FIG.2

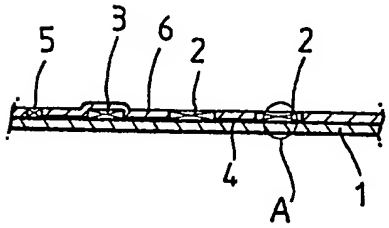


FIG.3

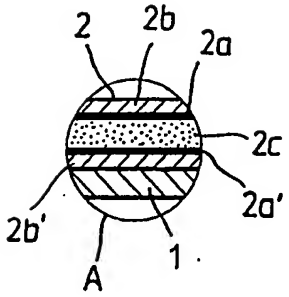


FIG.4

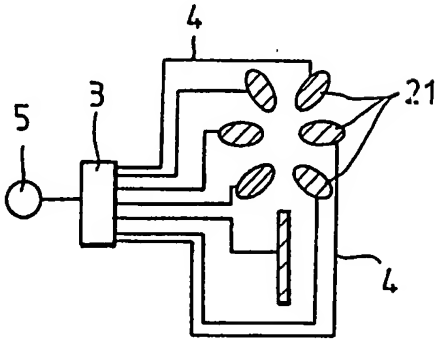


FIG.5

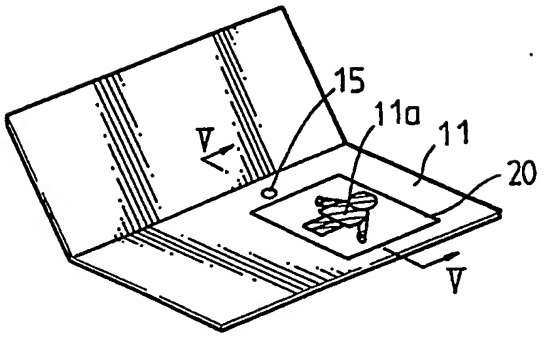


FIG.6

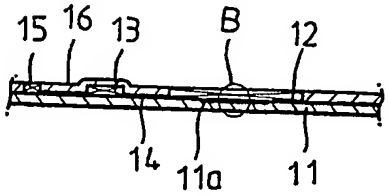


FIG.7

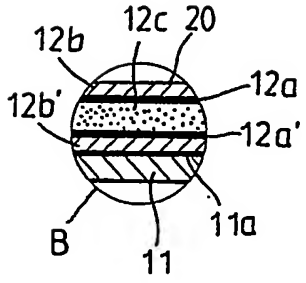


FIG.8

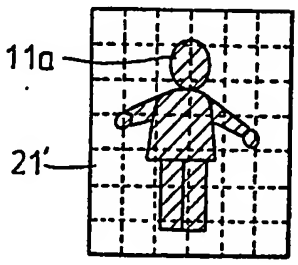


FIG.9A

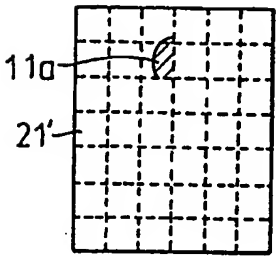


FIG.9B

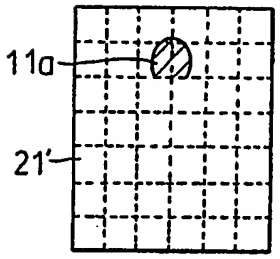


FIG.9C

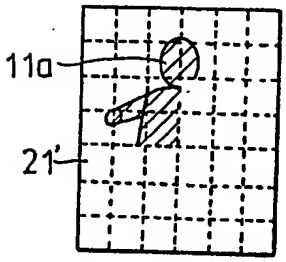


FIG.9D

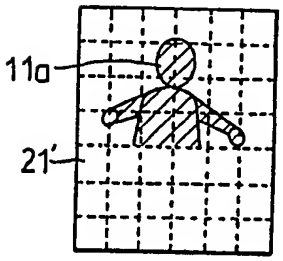


FIG.9E

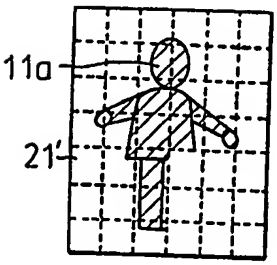
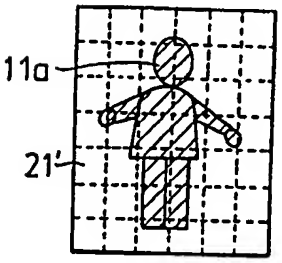


FIG.9F



CARD HAVING PATTERN DISPLAY FUNCTION

The present invention relates to cards including greetings cards and those used for advertising purposes, and more particularly to cards having a function to display a predetermined pattern.

Cards are used as a special means of communication between giver and recipient. For instance, short messages about the celebration of Christmas, a birthday, anniversary, etc., may be written on as well as inside the cards. Often such cards have blank inner pages. In addition to this, various ornaments such as a three-dimensional accessory or a small music generating component may be incorporated into a card. The three-dimensional accessories form three-dimensional shapes upon opening the card. The musical components reproduce a melody or message upon opening the card, or instead, when a thin built-in switch is switched for operation.

The conventional special cards as described above are intended uniquely to stimulate the recipient. However, such cards do not obtain the desired effect because of their familiarity.

Therefore, it is an object of the present invention to provide a card having a creative visual effect.

It is another object of the present invention to provide a card which has a higher commercial value by comprising a pattern display function.

According to the present invention there is provided a card with a pattern display

function, comprising a thin planar base and a thin planar cover on top thereof, wherein the base has, on the inner side thereof: a liquid crystal display portion comprising a plurality of display cell units, front and rear resin films separated from each other by a predetermined distance, a plurality of first electrodes of a certain pattern formed on the resin film, a second electrode opposing the first electrodes and being formed on the rear resin film, and a liquid crystal layer interposed between the front and rear resin films; a driver for driving said display cell units by time divisions to display sequential picture segments for a certain time, so that a complete picture is displayed after the certain time by driving all of the display cells; and a power source for supplying electrical power to the driver.

Embodiments of the present invention will now be described by way of example with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a card having a pattern display function according to one embodiment of the present invention;

Fig.2 is a cross-sectional view taken along line Il-II of Fig. 1;

Fig.3 is an enlarged view of portion A of Fig.2;

Fig.4 is a wiring diagram of a liquid crystal display portion and driver of the card shown in Fig. 1;

Fig.5 is a perspective view of a card having a pattern display function according to another embodiment of the present invention;

Fig.6 is a cross-sectional view taken along line V-V of Fig.5;

Fig.7 is an enlarged view of portion B of Fig.6;

Fig.8 is an extracted plan view of a liquid crystal display portion of the card having a pattern display function of the embodiment of the present invention shown in Fig.5, and

Figs.9A to 9F are plan views of the liquid crystal display portion shown in Fig.8 which show the picture display steps in the card of the embodiment of the present invention shown in Fig.5.

In the embodiment illustrated in Figs. 1 and 2, the card has a thin planar base 1 and a thin planar cover 1′ on top thereof. Base 1 and cover 1′ form a card, wherein one edge of each is connected. Base 1 comprises a protective layer 6, a liquid crystal display portion 2 having a plurality of display cell units 21, a driver 3 for driving them, signal lines 4, and a power source 5. Driver 3 consists of a small IC. Power source 5 works by receiving external light, and comprises a photoswitch such as a light-receiving sensor and a small additional cell such as a mercury cell or lithium cell. However, it is desirable that power source 5 comprises a photo-electric converter for converting external light into current, that is, a solar cell.

Referring to Figs.3 and 4, the liquid crystal display portion having the plurality of display cell units comprises front and rear resin films 2b and 2b′ separated from each other by a predetermined distance, a first electrode 2a of a predetermined

pattern formed on front resin film 2b, a second electrode 2a' formed on rear resin film 2b' and opposed to the first electrode, and a liquid crystal layer 2c interposed between the front and rear resin films. In the liquid crystal display portion 2, the first electrode 2a is provided in each of the display cell units 21 individually. Second electrode 2a' is provided in each of the cell units, having the same shape as that of first electrode 2a. It is more desirable however, that second electrode 2a' be formed individually on the inner entire surface of rear resin film 2b', so that all of display cell units 21 share the second electrode 2a' as a common electrode.

Driver 3 is connected to each of the display unit cells 21 via each signal line 4 for driving the display unit cells by time divisions. Liquid crystal display portion 2 displays sequential picture segments for a certain time after which the entire picture is displayed, since all the display cells 21 are driven. Driver 3 selects display cell units 21 individually at predetermined time intervals and continues to apply a driving voltage to selected cells until the power is disrupted.

When the card having such a structure is opened (cover 1' is lifted back from base 1) thereby receiving external light into power source 5, or a switch provided for power source 5 is switched on, display cell units 21 are sequentially operated to display a complete pattern of picture after a certain time.

In the present invention, the liquid crystal display portion can be improved as follows in order to display various

pictures.

Referring to Figs.5, 6, 7 and 8, a protective layer 16 and a liquid display portion 12 are provided on the inner surface of base 11. A driver 13, signal lines 14 and a power source 15 are provided adjacent to the protecting layer and liquid crystal portion.

Liquid crystal display portion 20 has a square display region which is divided in a lattice form to create a plurality of display cell units 21'. As shown in Fig.5, an object pattern 11a such as a picture, is provided between the liquid crystal display portion and base. It is desirable that object pattern 11a be printed on the inner surface of the base. If necessary, the object pattern may be printed on a separate sheet and the sheet interposed between the base and liquid crystal display portion. As shown in Fig.9A, since the object pattern is screened by the liquid crystal display portion, the object pattem is not displayed if the liquid crystal display portion is not operated. As in Figs.9B to 9E, when the driver is operated to drive the display cell units sequentially, the display region of the picture is gradually expanded. As in Fig.9F, all of the display cell units are operated to display completely the object pattem. In the embodiment, the liquid crystal display portion functions as a switchable window which determines the display of object pattern 11a located thereunder.

The liquid crystal display portion described above has the structure of an optical shutter using the optical effect of

liquid crystal serving as a nonluminous device. The structure is based upon design rules of a typical liquid crystal device, and hence there are no designing difficulty. It is desirable to use a custom IC as the driver, which has the required functions on a single integrated circuit, and also presents no designing ditficulty since it is based upon typical custom IC design rules.

The characteristic of the card of the present invention is not simply to provide a liquid crystal therein but to divide a pattern into segments and display the segments by time divisions ultimately to display the overall divided pattern so as to display a moving picture, in addition to the ordinary function of the card. Such a card having a pattern display function of the present invention possesses a new function which enhances its visual effect, so as to favourably stimulate the recipient. Further, the present invention can be extensively adopted in a picture frame which allows a picture to be seen when necessary, or a card used for product guidance (catalog) which selectively shows various articles.

While the invention has been particularly shown and described with reference to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the scope of the invention.

CLAIMS:

1. A card with a display function, comprising a thin planar base which has on one side thereof:

a liquid crystal display portion comprising a plurality of display cell units, front and rear resin films separated from each other by a predetermined distance, a plurality of first electrodes of a certain pattern formed on said front resin film, at least one second electrode opposing said first electrodes and being formed on said rear resin film, and a liquid crystal layer interposed between said front and rear resin films;

a driver for driving said display cell units by time divisions to display sequential picture segments, so that a complete display is obtained after a certain time by driving all of the display cells; and

a power source for supplying electrical power to said driver.

2. A card as claimed in claim 1, wherein said liquid crystal display portion has display cell units divided in a matrix form, and a separate object pattern is provided between said liquid crystal display portion and said base.

3. A card as claimed in claim 1 or 2 which further comprises a thin planar cover for said base, said one side of said base being that adjacent said cover.

4. A card as claimed in any preceding claim wherein said power source comprises a photo-electric converter device.

5. A card as claimed in any preceding claim wherein a single second electrode opposing said first electrodes is provided.

6. A card with a display function substantially as hereinbefore described with reference to the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number

9213681.1

Relevant Technical fields

(i) UK Cl (Edition K) B6A (ADE), G5C (CAB)

(ii) Int Cl (Edition 5) B42D , G09F

Search Examiner

H F YOUNG

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search

31 JULY 1992

Documents considered relevant following a search in respect of claims 1 TO 6

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2151549 A See figure 1 - note lines 21-29 of page 1	1
X	GB 2132135 A See figures 1 and 3 - note lines 11-23 and 39-42 of page 1	1
A	GB 1450423 See figure 1 - note lines 85-92 of page 1	1